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METHODS

OF

TEACHING GEOGRAPHY.

NOTES OF LESSONS.

PRINTED AT THE REQUEST OF THE TEACHERS
IN ATTENDANCE.

BOSTON, MASS.
BOSTON SCHOOL SUPPLY COMPANY,
15 Bromfield Street.
1883.

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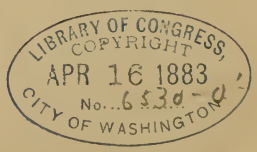

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BOSTON SCHOOL SUPPLY COMPANY,
15 Bromfield Street.
1883.

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INTRODUCTORY.

The inquiry *why* we teach geography naturally precedes the consideration of *how* we ought to teach it.

May we not assume that our main purpose is to give our pupils a real knowledge of the earth on which they live? We wish to lead them to perceive its wonderful adaptation to the wants of man; its resources for food, clothing, shelter, and for the arts and industries of civilized society. They should catch glimpses of its marvellous beauty and grandeur; and should find the close relations that exist between physical conditions and the life of different nations.

As teachers of geography we shall draw upon our largest resources in natural and physical science, in general history, and in art and literature. However elementary our instruction, we shall need a wide range of knowledge, as we travel, in imagination, with our pupils, over the broad earth; helping them to see phases of nature and of life, on sea and land, in hot and cold countries, on mountains and deserts, and among untutored and civilized people.

Geography, well taught, is an educational study, cultivating the imagination and judgment, as well as the memory; training the mind in both observation and language. Perhaps no other branch in the grammar-school curriculum gives opportunity for culture in so many directions. And there is no subject taught in which it is more necessary for the teacher to be independent of the text-book, especially in the arrangement of lessons, and in the apportionment of time,

according to the relative importance of the parts of the subject.

Text-books of geography must give more names, statistics, and facts than we wish to keep in our minds, or to have our pupils learn. They are, in a sense, reference books; correct, for the time, in many statements that will be untrue before the children of to-day take our places. We should not, then, cumber their memories with what may prove worse than useless rubbish, because not so easily disposed of.

Are we, then, to discard text-books? Certainly not; but we are to make them our helpers, not our guides. Are we to dispense with memory-work for our pupils? Certainly not. We must have it, or our teaching will fail in results. But we must put life and color into the dry facts of our text-books, and give, for the memory-lessons, only intelligent summaries of the valuable points of the instruction.

Are we to require the study of map-questions? Assuredly; but not the learning of a catalogue of names. Has there been any real addition to geographical knowledge when pupils have learned to repeat names with which they have no other associations than the places they occupy upon the map?

Are we to have definitions accurately stated? Certainly; but only when the thing to be defined, and the language that expresses the definition, are clearly comprehended.

Are we to have question and answer, or topical recitations? Surely both have a place. During the presentation of new points the Socratic method is the true one. The teacher must excite mental activity in the class by skilful questioning. The children must be led to think, to examine, and to express the results of their study. The teacher should *tell them nothing they can naturally find out for themselves;* but their earnest study should be supplemented by bits of information, vivid descriptions, and other illustrations, given by the teacher, in their proper connection. This, and this alone, is *true oral instruction*,

the direction of the mental activity of the pupils. After this come the memory-lessons; the definitions; and, finally, the reproducing of the different points of the geography of any country, by topical recitations. These should be the independent efforts of the pupils, expressed in their own language.

In the process of instruction a geographical vocabulary is formed. This should be fully grasped in both its spoken and its written forms. Hard words for children, perhaps we say. But do not children, like unlettered adults, seek the long words, and do they not insist upon having the right name for every new thing? They should have the habit of taking each new word through the eye, as well as the ear, and thus a geographical vocabulary, correct in spelling and pronunciation, will have a natural and gradual growth.

We come finally to the question of reviews. Must not the main points of the last lesson be gathered up before proceeding to the next in order? And is there not need of a careful review whenever the instruction on any topic or subject is completed, before passing to the next? Are not the best reviews often given incidentally, whenever points of previous instruction are referred to? Is not the application of knowledge previously acquired always its surest test? In this way only do pupils appreciate the need of recovering lost knowledge. Let us have reviews, frequent and thorough, without dull repetition, by putting the old facts or inferences into new connections; and, by showing the need of information, give the incentive to acquire it. Let our pupils, while taking new steps, find their dependence upon steps previously taken.

It is of great importance to have the course of study continuous and progressive, though our pupils must pursue it under the care of different teachers. Thus only can the best geographical results be secured in graded schools. Let us, then, so far as is possible in four hours, consider

methods of carrying out the outline course of study, in successive classes, in its three departments of physical, civil, and astronomical geography.

The notes which are here given indicate the arrangement and method followed; but no attempt has been made to reproduce the lessons in full.

PREPARATION FOR THE STUDY OF GEOGRAPHY IN THE PRIMARY SCHOOLS.

I. Lessons on Place (including Relative Position, Distance, and Direction).

1. (*a*) To illustrate the use of the prepositions of place; as *on*, *above*, *before*, *between*, *under*, *below*, *behind*, *around*, etc.

METHOD.

By placing objects.

The teacher places .....the pupil imitates.
The teacher places .....the pupil describes.
The teacher dictates.....the pupil places.
The teacher disarranges .....the pupil replaces from memory.

(*b*) To illustrate the use of the terms, right, left, middle, centre, corner, etc.

Lessons as above.

Right-hand corner
Left-hand corner
Front right-hand corner } of table or desk.
Back left-hand corner
Middle of right side, etc.,

(*c*) Representations by the pupils of the relative position of objects on table or desk.

2. (*a*) To show the necessity for a standard of distance.

(*b*) Measurements in the school-room: inch, foot, yard; meter, decimeter, centimeter.

(*c*) Representations on a scale, of the top of a desk or table, and of the floor, with the places of a few objects designated.

Thus far Primary-School work, and these lessons lead directly to the preparation for the use of maps.

II. Lessons on Plants and Animals.

That live on the *land;* in the *water;* fly through the *air.*

That have their home in *hot parts* of the earth; in *cold parts;* in *forests;* in *plains* and *deserts;* on *mountains.*

Most of the children have seen the animals that usually belong to a menagerie or circus, and know that many of them are brought across the great *ocean* from other lands.

III. Stories and reading-lessons about people who live far away.

In what kind of homes? What they eat?
What they wear? What they do?
What animals they use?

The friends of many of the children have been far away by *sea* or *land.*

IV. General knowledge gained by most children before entering the Grammar Schools.

1. Of *land* and *water.*
   Of the uses of each (for living, travelling, food-products, etc.).
   Of different modes of travelling (transportation).
   Of different occupations of people (familiar and unfamiliar).

Of different people and their ways of living (manners and customs).
Of different natural features (hill, pond, and island).

2. Of *air* all around, over land and water (atmosphere).
Of a draught of air (wind).
Of the quick drying of mud, clothes, etc., in a warm air; in a windy day.
Of the different forms of water (fog, clouds, rain, snow, hail).

3. Of the sun as giving light and heat.
Of the sun, moon, and stars, as far away.
Of divisions of Time: — day, night, week, month, year, spring, summer, autumn, winter.

4. Of the terms circle, circumference, diameter, sphere, hemisphere (from drawing and form lessons).

BEGINNINGS IN GEOGRAPHY.

A PLAN OF WORK, BASED ON THE PRELIMINARY KNOWLEDGE BROUGHT FROM THE PRIMARY SCHOOLS.

As the children have already a notion of land and water; of people living far away; of hot climates where oranges and bananas grow, and where lions and tigers live; and of cold climates where the fur-bearing animals are found; it seems desirable to lead them at once to think of geography as the study by which they are to learn about the great world on which they live, and over which people travel either for business or pleasure.

A few introductory lessons, that appeal to the imagination of the children, and excite interest by calling out whatever knowledge they may have, will present to them the idea of the whole earth, before taking up the study of topography, which should, of course, begin with the immediate surroundings; taking first whatever natural features are best known, and leading out to the study of the various forms of land and water.

The geographical vocabulary, spoken and written, should be formed as new words are introduced.

I. Lead pupils to a childlike conception of the earth as a great ball

moving in the air,
lighted by the sun,
with a surface of land and water.

(Address their imaginations, making "word-pictures.")

Illustrations: — A ball tossed into the air. — A balloon in the air. — Birds in the air everywhere. — Boys in other places flying kites. — Air all over the round earth. — A picture of a globe floating in air.

The evening star, another earth.

The moon, a small earth.

Illustrations of shape. — Beads, marbles, balls, oranges, and the globe, for *form only*, not for shapes of land and water until preparation for the use of maps has been made. — Alike in shape, — different in size.

Illustration of the flat appearance. — Horizon.

Illustration of size. — If a horse-car track could go around the earth; time to ride around once; more than half a year going night and day.

Illustration of the two motions. — Let one pupil stand for the sun; another pupil carry the globe round him, rotating it all the time.

Results. — Day and night. A year. (Sufficient for this stage of the study.)

Teach

Axis — real and imaginary.
Poles of the axis.
Circumference — diameter.
Equator, as related to poles.
(Illustrations — A ball and a knitting-needle — A spinning-top.)
Hot parts, as related to equator.
Cold parts, as related to poles.
Temperate parts, as between hot and cold parts.
Climate, as name for kind of weather.

II. Teach the natural features of the surface.

Begin with the most familiar.

"1. Observe. 2. Name. 3. Describe."

Aids to teaching. — Pictures; blackboard illustrations; moulding board. "Our World" No. 1.

Forms of Land.

Coast or Shore { beach. cliffs. bluffs.
Continent.
Island.
Peninsula.
Isthmus.
Cape.
Promontory.

Hill and Mountain { summit. slopes. base. peaks. chain. system.

Volcano { crater. lava.

Table-land.

Valley.

Plain { Forest. Prairie. Desert: oasis.

Water.

{ The great salt ocean flowing around and between the continents.
Fresh waters flowing through the land.

Forms of water.

Springs, — Brooks, — Rivers, — Lakes, — How formed ?

{ Pure water. Mineral. Hot. Geysers.

{ Branches. Source. Current. Mouth. Banks. Waterfalls. Uses.

Sea, — Gulf, — Bay, — Harbor, — Strait, — Channel, — Sound.

III. — Lessons in connection with the study of the natural features.

What the earth affords *on* its land-surface.

Vegetation.	*Animals.*
For food and drink (agriculture).	For food { live-stock. grazing.
For clothing (manufactures).	For clothing { furs. skins. leather.
For fuel.	For labor.
For medicine.	For utensils { ivory. bone.
For building-material (lumbering).	
For oils and dyes.	
For utensils.	

Some specially useful *plants*.

Cotton-plant.	Palms.
Sugar-cane.	Bamboo.
Rice.	Coffee-plant.
Grape-vine.	Tea-plant.

Fruits of hot climates.
Fruits of our climate.

Specially useful *animals*.

Horse.	Dog.
Cow.	Sheep.
Reindeer.	Goat.
Camel.	Silkworm.

What the earth affords *under* its land-surface : —

Building stones (quarrying).
Metals, Coal, Salt, } mining — manufactures.

What the water affords : —

Fish (fisheries).
Shell-fish.
Whales (whale-ships, oil, whalebone).
Sponge.
Sea-weed.
Salt.
Pearls.
Coral (reefs — islands).

Principal occupations of the people of the earth included in these lessons.

On the Atmosphere.

Air necessary to life — (illustrations).
Air in motion — (wind).
Moisture in the air — visible — invisible — evaporated — condensed, — (familiar illustrations).

IV. Introduction of Maps.

1. (*a*) Review Primary-school lessons on Position, Distance, Direction.

(*b*) Show the necessity for a *standard of direction*.

1. Tell a pupil to walk to the right, then *turn* and walk to the right.

(Thus show that he may walk to the right and reach opposite points of the room.)

2. Pass from the relative terms, right, left, etc., to the absolute terms, north, south, east, west.

Children facing the sun at noon — look south. Their shadows — fall north.

Facing the sunset — look toward the west.

Facing the sunrise — look toward the east.

(*c*.) Show compass — mark lines of direction on floor. Practical exercises to teach N., E., S., W., N.E., S.E., N.W., S.W.

Children walk, point, tell the direction of objects.

Children find the directions of other class-rooms; of other places from the school-house.

Tell how to go to their homes, give the directions.

(*d*) Representations on slates, keeping points of compass. (Table-top, floor.)

(*e*) Study a good plan (map) of the immediate vicinity, drawn on the black-board.

Take imaginary walks on it. Settles doubts by actual observation.

2. (*a*) Study a map of Boston, or of a part of Boston.

A stranger would like it — why?

Show where the surrounding towns are.

Describe places of interest.

(*b*) Children find the scale of the map; find distances.

3. (*a*) Why we need maps? How the first maps were made? Difference between picture and map.

(*b*) Children draw from the moulded form a representation of coast line, with bay, cape, peninsula, island, etc.

(*c*) Show an outline map of a continent (one without names preferable).

Children learn to read the map symbols for mountains, rivers, etc.

(*d*) Children find the natural features on maps of other continents or grand divisions.

(*e*) Find corresponding maps in their geographies. Compare scales. Compare scales of maps of the grand divisions.

(*f*) Find corresponding maps on the globe; find relative position and size.

(*g*) Pass from globe to maps of hemispheres (half the surface of a globe represented on a flat surface; illustrate).

V. General Study of the Maps of Hemispheres: —

The Continents or grand divisions.

Their names — number — *relative* position and size.

The Oceans.

Pacific — largest, many islands { volcanic, coral.

Atlantic — best known, most travelled, many gulfs and bays.

Indian — warm, small { pearls, spices, coral, sponge.

Arctic and Antarctic { cold, whales, seals, icebergs, sea-fowl.

Islands.

East Indies — hot climate { coffee, spices, gums.

West Indies — hot climate { fruits, salt, cigars, sugar.

Iceland — volcano, geysers.

Sandwich Islands — warm climate, much trade, in mid-ocean.

Azores — fine climate, in mid-ocean.

British Islands — (with Europe).

Japan Islands — (with Asia).

Newfoundland — (with North America).

Children like the strange and wonderful, are interested in the people and products of other lands; therefore it is well to take early the striking differences in nature and in the

people of the earth, before beginning the study of the countries of the grand divisions in order.

"The Seven Little Sisters" and the companion volume "Each and All" will furnish collateral reading.

Pictures, black-board illustrations, vivid descriptions, specimens of products, etc., will be of great service.

VI. General Study of the Grand Divisions.

Position on the globe.
  Climate — where hot, cold, temperate ?
Relative Position and Size.
  Refer to globe and maps of hemispheres.
Surrounding Oceans.
Form and Outline (character of coast).
  Chief projections and indentations.
  Study of outline by tracing or drawing, not from memory.
Mountain Systems.
  Comparative height.
  Direction of Slopes (Drainage).
  Plateaus — Valleys — Plains.
  Indicate mountains on the outline map.
Rivers and Lakes (principal ones only).
  Source; mouth, or outlet.
  Relative length or size.
  Indicate rivers and lakes on the outline map.
Most valuable productions — where ?
The important countries and their people.
A few well-known cities.
Specially interesting localities.

Interesting facts and associations.

Special points for North America.

Greenland (for a cold country) { Esquimaux. / Story of "Agoonack."

British America. — Forests, furs, hunters, trappers.

United States. — Our country { Middle part. / Temperate climate. / Many productions.

Mexico. — Hot, unhealthful coast-line — high, pleasant table-lands — cattle-raising, prickly pear, cochineal.

For South America.

Hot, forest lands, trees, animals, products, story of "The Little Brown Baby."

Grassy plains, cattle — Andes region, mines, earthquakes, volcanoes — Patagonia, dreary country, savages.

For Europe.

Many civilized nations.

Many occupations.

Many colonies sent to many parts of the world.

Mountain and river scenery.

Climate and products of different parts.

Interesting cities.

Stories of "The Little Mountain Maiden" and of "The Child of the beautiful river Rhine."

For Asia.

The largest grand division — all climates.

Highest mountains.

Siberia — cold, furs, forests, rivers.

Palestine or Holy Land.

Arabs, Chinese, Japanese, Hindoos.

Special animals and vegetation.

Story of "Pen-Se."

For Africa.

The least civilized of the grand divisions.

Climate mostly hot — Sahara, caravans.

Nile — overflow, pyramids.

Negro tribes. Lion, elephant, giraffe, etc. Palms, indigo, etc.

Stories of "Gemila" and "Mañenko."

For Australia.

Hot climate — droughts.

Gold, wool, queer animals and plants.

Example. Summary of the Study of the Grand Divisions.

To be made by the Children.

Grand Division.	Size relative.	Position.	Climate.	Mountains.	Rivers and Lakes.	Productions.			People.
						Mineral.	Vegetable.	Animal.	
Asia.	Largest.	Old World, Northern Hemisphere.	All climates. Very hot. Very cold.	Highest. Run from E. to W. Himalaya, Altai, Ural.	Ganges, Indus, Euphrates, Yang tse Kiang, Hoang Ho. Yenesei. Not many lakes.	Gold, Silver, Iron, Precious Stones.	Rice, Cotton, Indigo, Bamboo, Tea, Coffee, Jungles, Pine forests.	Tiger, Elephant, Serpents, Camel, Silk-worm, Goat, Fur-bearing.	Chinese, Japanese, Arabs, Hindoos, Turks, English, Russians.
Africa.	Second.	Old World, Northern and Southern Hemisphere.	Mostly hot. Crossed by the Equator.	Atlas, Kong, Snow.	Nile, Niger, Zambesi, Orange. Many large lakes. Albert, Victoria, Tchad.	Gold, Gold-dust, Diamonds.	Palms, Cotton, Indigo, Gum-trees, Bulbs, Grains.	Lion, Elephant (*ivory*) Camel, Hippopotamus, Rhinoceros, Crocodile, Gorilla, Apes, Hyena, Ostrich, Giraffe, Sheep (*wool*).	Arabs, Turks, Egyptians, Negroes, Dutch, English.

Tabulate one grand division at a time. Children tell. Teacher write on the black-board. Then each pupil write from memory. In review. — Tabulate all the grand divisions. Compare. Trace similarities and differences.

The children are now prepared to take up such study of the countries of each grand division as is adapted to their age.

VII. Method of Study for the Countries of a Grand Division.

Example. — A plan for the study of New England.

1. Preparation implied.

America — the New World — how discovered?
West Indies — why so called?
First settlements in South and North America.
(First chapters in "Stories of American History," as collateral reading.)
Appearance of our country when discovered.
Indians — European colonies.
The United States — how formed?
The thirteen original States — where?
Present extent of the United States.
General study of the United States.
New England — in what part of the United States?
What mountain system crosses it?

2. Take map of New England.

Have the moulded form, showing direction of mountains slopes, drainage, rivers, and lakes.

Why called New England?
Names of the six States.
Coast line, articulation of.
Other boundaries.
Mountains.
Two main ranges — highest peak, summits, slopes, trees, scenery, rock quarries — "Granite State."
Drainage.
Valleys, rivers (rapid currents useful for?), lakes.
Climate.
Different kinds of surface.

Different occupations of the people { quarrying. lumbering. fishing. commerce. manufactures. farming.

Where the good places for cities?

Find the most important cities noted for { manufactures. commerce and trade. capitals.

Description of interesting localities, cities, etc.

3. Map Drawing combined with study.

Children now prepared for such study of the text-book as is desirable. Ready to seek information elsewhere. "Guyot's Introduction," as collateral reading. Pictures, specimens, etc.

(*Put no names on the map at first. Memory-drawing not required.*)

(*a*) Review study of outline.

Draw the outline (on paper).
Draw boundaries between the States.

(*b*) Review mountains.

Indicate mountains on the outline map.

(*c*) Review rivers and lakes.

Indicate rivers and lakes on the map.

(*d*) Review cities.

Indicate cities on the map.

(*e*) General Review.

Put on the map, from memory, names of bays, capes, islands, mountain-ranges, rivers, lakes, and cities.

4. Summary of knowledge gained to be given by the children, without questions, in the order of topics.

Imaginary journeys described.
Letters from different places.

More or less time should be given to the sections of our own country, and to the other countries of the world, according to their relative importance.

A few striking points, strongly made, would be sufficient for the whole continent of Africa, in this first course.

Example.

1. — Africa.

Thorough training with the use of maps as to the position of Africa and its relation to other grand divisions. Regular coast line, disadvantages of: — *Mountains* — Chains along the coast, the highest on the east. Atlas, Kong, Snow mountains. *Rivers* — Nile, flowing northward; Congo, Niger, Zambesi, and other rivers flowing into the Atlantic and Indian oceans. *Divisions* — Egypt, Abyssinia, Barbary States, Sahara, Soudan, Guinea, Cape Colony. *Cities* — Cairo, Alexandria, Suez, Algiers, Cape Town.

2. — North Africa.

Atlas mountains along the northern coast; hilly country on the borders of the torrid zone; climate pleasant, nearly tropical. Date and gum trees, fragrant and medicinal plants; lions, gazelles, hyenas, jackals. Exports — dates, nuts, oil, sponge.

People not negroes, but Arabs, Moors, Turks — all Mohammedans — some civilized, living in cities; others wandering Arabs, living in tents.

Dress and customs of Mohammedans. Characteristics of Mohammedan cities — narrow streets, flat house-tops, mosques, etc. (Selections from Lane's "Modern Egyptians"; Bayard Taylor's "Lands of the Saracen.")

Egypt — a narrow valley between the desert and the Red Sea. Suez canal. The Nile — its course, overflow, delta. Cultivation of cotton, wheat, sugar-cane, etc. —

Villages and palms along the river; no forests; pyramids and ruins along its lower course (mention of ancient history); cities near the mouth. — (See "Egypt," by Stanley Lane-Poole; "Egypt and Nubia," by J. A. St. John.)

3. — **Sahara.**

The great desert — sandy levels, rocky ridges, oases, sand-storms; Bedouins; caravans coming and going between northern cities and towns of Soudan; stories and pictures of desert life.

4. — **Almost Unexplored Region.**

Great wilderness inhabited by uncivilized negro tribes, wearing little clothing, living in circular mud huts with thatched roofs; occupation chiefly hunting and warfare. Rough earthen-ware, mats, etc. Some of the more advanced tribes make cotton cloth in small pieces, spears, anklets of iron and copper, and cultivate patches of cotton, indigo, and millet. Manners and customs. Rivers with crocodiles and hippopotami. In the forests, elephants, lions, antelopes, giraffes, gorillas, apes, etc. — (See the works of Livingstone, Stanley, and other explorers.)

5. — **West and East Coasts.**

Low, hot, tropical country; rice, peanuts, castor-oil plant, and thick forests or jungle along the rivers. Native huts, and here and there small trading towns (Portuguese and English), where merchants exchange calico, guns, knives, beads, etc., for ivory, ostrich feathers and beeswax, which the natives bring from the interior; and for palm-oil, peanuts, rice, gold dust, etc., obtained on the coast.

6. — **Cape Colony.**

In possession of the English. Story of the discovery of the Cape. Dutch sheep-farmers inland — gold and diamond diggings. Wool the chief export.

SECOND COURSE.

The first course, for children, should be mainly observational and descriptive, with only such inferences in regard to physical influences as the children can be led to make from facts observed by them or given to them. If this course creates an interest in the further study of the world, and gives, to those pupils who may not take a second course, a knowledge of the different natural features and products, and of the life of people in the different parts of the earth, the desired ends are accomplished.

The second course should be more logical and systematic, though, in both statements and illustrations, it should still be simple.

As the climate of any part of the earth depends primarily on its solar heat, and as natural products and civilization depend mainly upon climate, it is important that this second course should be based upon the consideration of the earth's relations to the sun.

I. The Form of the Earth.

The ancient nations, living around the Mediterranean, believed that the earth was a great plain, surrounded by an ocean, from which the sun rose, and into which it set. The earliest maps and descriptions that have been preserved (about 500 B.C.) tell us this.

Long before the time of Columbus, learned men believed the form of the earth to be that of a globe; but the belief was not general.

Columbus thought he had reached India, when he found America; and this fact shows that he had no conception of the *size* of the earth.

Proofs of its Form.

(*a*) Magellan's Voyage (1520).

(*b*) Vessels coming in sight — how seen?
Vessels going out of sight — how seen?
Illustration — a toy ship on a globe.
Cause, curvature of the surface of the sea.

(*c*) Sailors approaching land — what first seen?

(*d*) Horizon — The *circle* of vision. Everywhere a circle.
Horizon on a plain.
Ascending a hill.

(*e*) Shadow of the earth — eclipse of the moon.
Only a sphere can always cast a circular shadow. Illustrate.

(*f*) Spheroidal, not spherical.
Difference in diameters.

II. Size of the Earth.

Circumference at the equator.
Diameter at the equator.
Diameter in direction of the axis.
Illustration. — Time for railroad train to go round the circumference (25,000 miles.) — Rate, 30 miles an hour. — More than a month, making no stops.

III. Latitude and Longitude.

Means of fixing the position of places on the earth, necessary.

Lessons with use of a globe.
Find Equator — where? It is the circumference of a circle — where the centre of the circle? — where the plane of the circle?
(Accustom the pupils to the planes of circles before teaching the plane of the orbit. Cut apples to illustrate.)
The Equator a *great* circle.
Find Parallels — why not great circles?
centres where?
planes where?

Every circumference divided into 360 degrees.

" " measures four right angles.

The length of degrees differs on the parallels.

Parallels mark distances north and south of the Equator — called Latitude.

What else needed to fix the position of a place ?

No natural starting-place (or circle) from which to reckon distance east and west.

Different countries use different circles.

They must be north and south circles.

They must all pass through the poles.

They mark the line of the mid-day shadow at any place — the *north* and *south line.*

They are therefore called Meridians (from mid-day).

Every place has such a line for mid-day shadows.

Extended, it makes a circle passing through the poles.

On the half opposite the place is the midnight line — or mid-day line for the place opposite.

All the meridians are great circles —

having their centres where ?

having their planes where ?

How find the meridian of a place on a sunny day ?

How can a sailor or traveller find the meridian of a place at any time ?

How find the meridian on a starry night ?

Where would a person standing on the north pole see the pole-star ?

Where, if standing on the equator ?

Where do we see the pole-star ?

How find the north and south points of the horizon from the pole-star ?

Draw a semi-circle in the air to connect the north and south points of the horizon.

It must pass through the *zenith.*

Observatories have such a visible north and south semi-circle, very carefully placed. Therefore such a circle is taken to reckon east and west distances from.

One at Greenwich, England;

" Paris, France;

" Washington.

We generally reckon from the English starting-point:

East and West distances, called Longitude. 180° East; 180° West.

North and South distances, called Latitude. 90° North; 90° South.

Why these terms? (They would not be selected now.)

All places on the meridian of Greenwich have no Longitude, when that meridian is used as the *First* or *Prime* Meridian. Sailors, on the ocean, have to find their Latitude and Longitude (the place of their ship) by observing the sun.

Give the class practice in finding Latitude and Longitude of certain places, and in finding places when Latitude and Longitude are given.

Latitude, measured where?

Longitude, measured where?

Why degrees of Longitude vary in length? (Pupils discover.)

IV. The Motions of the Earth — Effects.

1. The round earth floats in space, as a balloon floats in the air.

It is lighted by the sun. How?

Illustration. — Hold a ball in the sunlight, or before a lighted lamp.

However it is held, *one-half* is lighted.

The same is true of the earth.

1st point. — Always a hemisphere lighted.

If the ball and light are both motionless, the same hemisphere is always lighted.

What effects, if this were true of the earth?

Turn the ball on its axis once. (Knitting-needle for axis.)

2d point. — Observe the lighted hemisphere constantly changing.

Why?

2. Rotation.

Then the turning of our earth on its axis gives us day and night.

Evidences of the earth's rotation.

Apparent daily movement of the heavenly bodies.

Illustration. { In a moving railway car.
Real and apparent motion.

The *difference in the speed* of rotation of different parts.

Greatest speed at the equator — about 1,000 miles an hour.

Speed decreasing toward the poles.

(*a*) Let the axis of the ball (representing the Earth) be upright.

Rotate and observe effect.

Pupil put on a card-board disc, or day circle, to separate the light and dark hemispheres.

It passes over the poles.

Day and night everywhere alternately.

(*b*) Let the axis be horizontal. Rotate.

The day circle will correspond with the equator.

The same hemisphere always lighted.

(*c*) Let the axis be oblique. Rotate.

The day circle neither passes over the poles nor corresponds with the equator.

Around one pole, constant day.

Around the other pole, constant night.

Is any one of the three cases (*a*, *b*, *c*) true for our Earth?

Then there is something more to find out yet.

With the day circle or a black cap covering a hemisphere ("night cap"), and a wafer, on a ball or globe, illustrate sunrise — noon — sunset — midnight — for some place.

We say the sun rises when Boston turns into the sun's light. (Real and apparent motion.)

Give practice in finding sunrise, etc., for different places on the ball.

Does the sun rise and set in Boston at the same time all the year?

Is the sun ever higher in the sky, when you go from school at noon, than it is now?

Let us find out the reason for these differences.

3. Revolution. Changes of Seasons.

(*a*) Who can tell about another movement of our Earth?

We will give our ball the other movement. What are the names of the two poles of the earth's axis?

If I call the upper end of the ball's axis the *North* pole, what must I do?

Place the ball with its axis pointed rightly and inclined rightly, and with the north pole turned toward the light. Pupil put on a disc or cap, as before.

How is the earth lighted now?

Which pole is in sunshine?

Can any one tell which of our seasons this represents?

(*b*) Carry the ball to the opposite side of the lamp (thus making a strong contrast in conditions).

Pupil arrange disc or cap now.

How is the earth lighted now?

Which of our seasons is represented? Why?

(*c*) Carry the globe through the next quarter-revolution.

Pupil arrange now for the lighted hemisphere.

Tell how the earth is lighted now?

Which of our seasons now? Why?

(*d*) Complete the revolution. Restore the first conditions. Arrange and describe. Pass through the next quarter-revolution. Find conditions for our spring and for autumn in the other hemisphere.

(*e*) Give sufficient practice to strengthen the points made.

Let a pupil take the ball. Arrange and make the revolution. Class observe — tell. Finally have written descriptions.

Summary.

Then the changes of the seasons are caused by (1) the revolution of the earth around the sun; (2) the inclination of the earth's axis; and (3) the unvarying direction of the axis. Any two of these causes, acting without the third, would not produce a change of seasons.

Let pupils illustrate the action of two conditions without the third.

4. Variation in the length of day and night.

(*a*) Introducing both motions of the ball.

Draw the equator and the parallel of Boston.

Pupils find which circle is exactly half-lighted, however the disc is put on.

What about the lighting of the parallel?

Mark the place for Boston with a wafer.

(*b*) Put the ball in position for the northern midsummer.

Show position for sunrise at Boston.

Show where on the same parallel it is sunset.

Mark this place with another wafer.

Rotate the ball.

Are these wafers longer in the dark or in the light?

What do you know then about day and night, on our parallel, at this time of the year?

(*c*) With the ball in the same position, put a wafer on the part of the earth where Agoonack (the Esquimaux girl) lives.

Tell about her day and season.

Hold a crayon on the farthest point of the surface beyond the north pole that sunlight reaches.

Rotate. — Keep the crayon in position and let it draw a circle as the ball rotates.

Rotate again. — Pupils watch and tell about the *day* of all places *within this circle.*

(*d*) Hold a crayon on the *central point* of the lighted hemisphere.

Rotate. — Let the crayon draw a circle.

Lead pupils to tell that *all places on this circle* have a *vertical sun* at noon.

Rotate several times. — Pupils tell about length of day and night in different places.

(*e*) Carry the earth through half a revolution.

Pupils tell the conditions and seasons. Repeat the experiments and draw the corresponding circles in the southern hemisphere.

Practice and reviews necessary.

(*f*) Where did we draw the polar circles?
Where did we draw the other two parallels?
Let us see upon what their places on the globe depend.

Change the inclination of the axis.

Rotate. — Pupils see that the places of these circles are changed.

Then their places depend upon the slanting of the axis, 23½ degrees from the upright position.

Remember that the axis inclines 23½ degrees, and that each pole points always in the same direction.

Practice and reviews needed.

(*g*) Place the ball in the intermediate positions for spring and autumn.

Use day circle or cap as before.

Lead pupils to see that *one-half of each parallel* is lighted.

Rotate. — Lead pupils to infer that days and nights are equal everywhere (say nothing of the very poles).

What season in each hemisphere?

(*h*) Carry the ball through a quarter-revolution slowly, rotating it all the time.

Pupils notice and describe the *gradual* changes in season and length of day for either hemisphere.

Practice and reviews.

5. Tropics and Polar circles.

The pupils are ready now to state—

(1) That the tropics mark the limits of a vertical sun. Why called *tropics?*

(2) That the polar circles mark the limits of the continuance of daylight for more than twenty-four hours.

Lead the pupils to discover that the sun is overhead at the tropics, once each year.

Overhead between the tropics, twice each year.

" at the northern tropic at our midsummer.

" " southern tropic at our midwinter.

" " equator in spring and autumn.

" at all places between equator and tropics at intermediate times.

6. Orbit and Plane of Orbit.

Place a circular piece of card-board around a globe or ball representing the sun.

Hold a smaller ball (representing the earth) rightly, so that a hemisphere shall be above the card-board.

Lead pupils to see that the centres of the two balls are in the *plane* of the card-board, and that this plane might surround the earth as it does the sun, and extend far in all directions.

Lead them to imagine an *immense* distance between the balls; so that the space between the sun (the large ball) and the wall of the room behind it would be as nothing to any one on the earth (the small ball) looking at the sun. — The sun would seem to such an observer to touch that wall, as a tree on the top of a distant hill seems to touch the sky behind it.

Our sky seems like the inner surface of a hollow hemisphere, (where is the other hemisphere ?), with the sun, moon, and stars moving over it. So the sun seems to us to be among the stars. The stars are really *very much farther away than the sun.* If the school-room were dome-shaped, we might imagine its walls to be the sky for our balls. Let us try to do so.

Let the earth revolve round the edge of the card-board (keeping conditions of axis, etc.).

Pupils (imagining the great distance) tell where, on the walls, the sun might seem to be, as seen from the revolving earth. (Perhaps near certain pictures on the walls, taken as stars.)

The path in which the earth moves round the sun is called *its orbit.*

The card-board represents an imaginary *flat surface*, passing through the centres of both sun and earth, on which this path or orbit lies. This imaginary surface is called *the plane of the orbit* { Imaginary axis. / Imaginary plane.

Then the sun seems to move among the stars in the sky, because the earth really moves among them.

As the pictures on the walls have names, so groups of stars have names, because long ago people thought they could find pictures in the stars. One group was called a great bear, or a great dipper (who ever heard of that in the sky ?); another a dog; another a warrior with his belt and sword (did any one ever see Orion on a beautiful winter night ?), etc.

One of these groups of stars was called Cancer (a crab); and as the sun seemed then to be in this group of stars when overhead, to people on the northern tropic, we have the name *Tropic of Cancer.* (No attempt need be made to show the present distinction between constellations and signs of the zodiac.)

When the sun was overhead to the people on the southern tropic, he seemed to be among the stars that form the group called Capricornus (the goat); and so we have the name *Tropic of Capricorn.*

The north pole of the earth points to a group of stars called Arctos (the bear), and so we have the name *Arctic Circle.*

The opposite pole is named Anti (or opposite) the Arctic; and so we have the name *Antarctic Circle.*

Tropical has come to mean hot, and Arctic to mean cold or frigid.

7. Zones.

The tropics and polar circles mark the earth off into belts or zones. Find them on the map.

Between the tropics — the hot or Torrid Zone.

The rainy and dry seasons. When? Why?

Between the tropics and polar circles — the two Temperate Zones.

Four seasons — The most favorable conditions for civilization.

Between the poles and polar circles — the two Arctic or Frigid Zones.

Short summers — long winters.

Lead pupils to *observe* the difference in the daily path of the sun, from month to month, and to report it. To observe also the difference in time and direction of the sun's rays coming through a school-room window at different seasons. Also the greater heat of noontime rays than of the morning or evening rays — Of summer than of winter rays.

Give or read some vivid description of the long winter night in northern regions, with its auroras, etc.; then the gradual return of the sun; first a long twilight, then a peep of sunlight; then lengthening days, till the sun does not set. Then the gradual decline of sunlight into night again.

Poem "Bidding the Sun good-night in Lapland," by Joy Allison.

8. Difference in Time from Difference in Longitude.

Did you ever hear that a traveller finds his watch wrong when he arrives at a place east or west from his starting-point?

We can now find out why this is so. Let us put a wafer on our globe where London is, another where Boston is. Put both places on the dark side. Rotate the globe. Raise your hands when the sun rises on one of these places — which? Now the London clocks should show sunrise time. Should the Boston clocks show time before or after sunrise?

If a watch, right for London time, were brought here, would it be too fast or too slow ?

If a Boston watch were carried to London, would it be too fast or too slow? Why?

Compare Boston and San Francisco time.

Compare Boston and Chicago time.

Can we find out how much too slow or too fast these watches would be?

What do we know about the time of the earth's rotation?

What do we know about the number of degrees in every parallel?

What do we call distance east or west on the earth?

Who can solve this problem: If a place on any parallel rotates in 24 hours (makes the whole circle, or 360°), through how many degrees would it rotate in *one* hour?

Then how many degrees of longitude would make an hour's difference in time?

Now find for yourselves difference in time between severa places.

V. Winds — Currents of Air.

1. Why consider winds? Because they are the great modifiers of climate.

What is air?

We have an envelope of air (the atmosphere) around the earth, more than 100 miles deep. It differs in density — heavy near the earth — lighter as it is higher above the surface.

(Illustration — Difficulty in breathing on a high mountain.)

Air becomes lighter by taking watery vapor.

Barometer, as measure of pressure or weight of the air. As indicator of a storm coming.

Air becomes lighter (expands) by being heated.

(Illustration. — Hot air rising over a fire — upward draught.)

2. Why is the atmosphere restless? Why winds?

Experiment. — Warm school-room — cool corridor — lighted candle held in the door-way. Candle at top of the door-way, flame blows toward the corridor. Candle at bottom of the door-way, flame blows toward the room.

Two currents of air in opposite directions; the lower a cold current — a surface-draught or wind.

These currents are caused by a difference of temperature in the room and corridor. The hot air rises, and cold air flows in to supply its place.

3. Breezes at seashore in the summer.

During the day the land and the air over it are hotter than the surface of water and the air over it.

What kind of breeze? Sea breeze.

(*Note.* — Wind always named by the direction from which it blows.)

During the night and early morning, a land breeze. Why?

Inference. — Winds are caused by differences of temperature.

Direction of wind shown by weather-vane, drifting clouds, smoke.

4. Trade winds. Origin. Direction.

What do we know about differences of temperature on the earth? What parts always hot? What parts always cold? What, then, can we say about currents? Always currents of cold air blowing from the polar regions toward the equator. Always hot air rising over the hot regions, and passing off toward the cold regions.

If the earth did not rotate, these polar winds would blow in the direction of the meridians. But the atmosphere rotates with the earth, — that over the polar parts, slowly; that over the hot parts, rapidly.

What happens, then, to a stream of air coming from the north polar region toward the equator? Can it move in a north and south line?

It has less speed of rotation than the parts of the earth over which it passes, so it falls more and more behind the meridian on which it started. It falls westward, or

blows more and more from the eastward, as places farther south rotate under it.

So it is successively a north, north-east, and finally an east wind in the torrid zone.

What happens to a similar stream of air starting from the south polar regions?

Then in the Torrid Zone there is a nearly constant east wind. Before the days of steam ships the world's commerce depended so much on this wind that it was named the *Trade Wind.*

Think why the "Windward islands" and "Leeward islands" were so named by sailors.

5. Return currents.

What becomes of the heated air that rose over the hot regions?

Where would air be needed?

Would this heated air, rising, be felt *on the surface* of the earth as a wind?

Would it get cooled? How? What then?

What would be its speed of rotation?

How, then, would it blow over the northern hemisphere? (Our pleasant S.W. winds.)

How over the southern hemisphere?

These are sometimes called the *return trades.* These winds bring abundant moisture to Western Europe, to the Pacific coast of North America, and to the coast of Chili.

6. Zone of calms.

Over the most heated equatorial belt the air is constantly rising in an *upward* current.

Would there be a surface wind?

This, then, is the Zone of Calms that sailors dread. (Read from "The Ancient Mariner.") Sudden gusts, hurricanes, etc., occur, however, for the upper current is often disturbed.

It does not correspond exactly with the equator, because the land-masses make the temperature highest a little north of the equator.

7. Monsoons. — Season winds.

During the northern summer the great land masses of Southern Asia become so heated that the air rises, and currents from the Indian Ocean blow in — called the *South-west Monsoon.* During the southern summer the reverse happens, from the great heat of the African lands, and there is a *North-east Monsoon.*

These winds are felt in the northern part of the Indian Ocean and the adjacent parts of the Pacific.

8. Variable winds.

The temperate zones have frequent changes of winds, and the winds blow from every direction, as we know. The polar winds and the return currents are, however, the prevailing winds.

9. Winds as purifiers, etc.

Winds as purifiers of the earth's surface.
" " distributers of moisture.
" intercepted by mountain ranges.

VI. Ocean Currents.

The trade winds, the great evaporation within the topics, and the difference of temperature between the equatorial and polar regions determine these.

After teaching winds, the causes and course of the currents are easily taught. *Polar, Equatorial, Return Currents.*

Then follow on a map the currents of the different oceans.

Show advantages.

Show effects of Gulf Stream — climate of Western Europe, storms, fogs, driftwood.

Take imaginary voyages, and let the class decide upon winds and currents that would help or hinder.

THE PHYSICAL GEOGRAPHY OF THE CONTINENTS.

When the foundations for the study of physical geography are laid, a class is ready to take up the examination of the physical character of each grand division. Application should be made constantly of the knowledge gained of the distribution of solar heat, and of winds, currents, etc., as the modifiers of climate.

The comparison and contrast of the physical conditions of the different grand divisions will give the repetition necessary to make this preparatory knowledge permanent.

OUTLINE FOR THE STUDY OF THE PHYSICAL GEOGRAPHY OF A GRAND DIVISION.

I. Position on the Globe.

Hemisphere.
Zones.
Crossed by what circles? Where?
Limits as to latitude and longitude.
Position relative to other Grand Divisions.
Surrounding waters.
Land boundaries.

II. Size.

Relative to the other Grand Divisions.
Area — in round numbers.

III. Shape.

General form.
Outline — regular or irregular. Compared with that of Grand Divisions previously studied.

Description of coast. { Projections. Indentations. Border Islands.

Outline drawn as a part of the study of shape, not from memory at first.

Practice in map-drawing as the study proceeds. When construction lines are used let them be derived from the map, and let the climatic circles that cross the Grand Division appear on the map.

IV. Surface.

Highlands. { Primary. Secondary. } { Position of Mountain Systems. Direction. Ranges. Highest Peaks (see note). Volcanoes. Plateaus. Height and extent (see note). Slopes. }

(Best studied by the use of a moulding-board.)

Lowlands. { Plains — fertile or desert. Valleys.

Striking scenery.

Profiles drawn.

Mountain systems indicated on the outline map.

Comparison with Grand Divisions previously studied.

V. Drainage.

Water-partings and Water-sheds. { Direction. Extent (see note).

River basins. { Limits of. Relative size (see note).

Principal Rivers. { Source. Direction. Main Stream and Tributaries. Mouth, Delta, Estuary, etc. Characteristics. { Navigable or not. Scenery. }

Lakes — Location. { Salt. Fresh.

Principal Rivers and Lakes indicated on the outline map.

Comparison with Grand Divisions already studied.

NOTE. — (Memorize *very few* exact measurements. Compare others with these standards.)

VI. Climate.

Temperature of different parts inferred from Position on the Earth.

Variations in Seasons, and in length of Days and Nights in the different parts.

Modifications of { by Relief. / by Winds and Currents.

Moisture or dryness of different parts.

Healthfulness of different parts.

Comparison of Coast with Interior.

Comparison with Grand Divisions already studied.

VII. Life.

Vegetable. { Of different parts, inferred from climate. / Special for different regions. / Peculiar to the Grand Division. } { Wild, / Cultivated, / or / Domestic. }

Animal.

Human. { People of different parts. / Savage — Nomadic — Civilized.

Compared and contrasted with other Grand Divisions.

VIII. Regions adapted to —

Mining or Quarrying — Resources of each.

Agriculture or Grazing.

Manufactures.

Commerce or Trade.

IX. Good Positions for important Cities — Natural Advantages.

X. Topical Review — oral and written — with Map drawn from Memory.

POLITICAL GEOGRAPHY.

Having studied and compared the physical conditions of the Grand Divisions, a class is prepared to take the study of the countries of each, with special reference to the life of their inhabitants. Pupils can now be led to perceive that varied physical features give the opportunity for varied industries and a higher degree of civilization. They will see that natural barriers are often the boundaries between countries.

This study of the people of the earth will naturally be preceded by the consideration of their division into races, states of society, different forms of government and religion, with the characteristics of each.

If the usual arrangement of text-books be followed, the detailed study of North America will be taken first; that of South America next; and then the countries of the Old World will be studied. This seems, at first, the natural order; but, in this *Second Course* of lessons, there are advantages in taking the study of the civil geography of the New World after that of Europe. When our pupils have learned the national traits of Spaniards, Portuguese, Dutch, English, and French, they are interested in finding them transplanted into the lands that are or have been colonies of European nations. They will anticipate the social conditions, and will readily trace for themselves the descent of the inhabitants by the names on a map.

We can easily lead them to see why the nations of Southern Europe were early navigators; and how naturally the course of discovery was along the African coast, till India, long

known, had been reached by water; and that the hope of reaching it sooner, by sailing westward, led Columbus to the discovery of America.

As the geography of countries is closely associated with the study of their history, so historical links should be made in studying political geography. Experience has proved that there is both economy of time and increase of interest for a class, when the special study of Europe precedes that of the political divisions of the New World. The following order of study is therefore suggested: —

The Countries (1) of Europe — (2) of North America — (3) of South America — (4) of Asia — (5) of Africa — (6) Australia; Malaysia, and other islands of the Pacific.

METHOD OF STUDY FOR THE COUNTRIES OF A GRAND DIVISION.

I. A general Review of the physical Features of the Grand Division, with Map-drawing from Memory.

The names, relative position and size of its countries — Historical points — Settlements.

Map-drawing of a country, as the study proceeds, in the manner indicated for the study of New England, in the first course. (With or without the use of a moulding-board.) Rapid sketches from memory of maps of the most important countries, and of sections of the United States, so far only as time will permit without abridging the descriptive geography. Practice-maps will be important aids in the study and review.

II. Study of a Country.

Position in the Grand Division — Boundaries.

Character of the coast-line, if any.

Surface. { What mountain system, if any, crosses it? Ranges — High peaks — Scenery — Resources. Different kinds of surface — Adapted to. Rivers — Lakes — Useful for?

Climate. { Inferred from position on the earth. Modified by Relief, Winds, Ocean Currents. Moisture, Dryness, Healthfulness — of different parts. Compared with that of the other countries.

Vegetation — wild and cultivated — products of different parts.
Animal Life — wild and domestic — special or peculiar.
Inhabitants.
- Races — Languages — Government.
- Religion — Education — Customs and Manners.
- Occupations.
  - Agricultural — Staples.
  - Mining — Products.
  - Fishing.
  - Manufactures — Kinds of? Where?
- Trade and Commerce.
  - Exports — where sent?
  - Imports — where obtained?
- Population — where sparse — where crowded? Why?
- Important cities and towns — situation — natural advantages.
- Description of the most prominent city or cities.

The best way to review and strengthen the elementary knowledge of astronomical and physical geography, previously acquired, is to apply it as the study of countries proceeds. Such of these questions as are appropriate will recall it.

Does any part of this country have a vertical sun? If so, what part? Why?
What do you know of the change of seasons in this country?
Compare a winter and a summer day at ——— city.
What other cities of the world (or what cities of countries recently studied) are in about the same latitude?
How do they compare with this city in climate and industries?
Do any of these cities have noon at about the same time?
How does the time of day at ——— city compare with our time?
Does any part of this country have the trade wind?
What are the prevailing winds? Why?
Which slope of the mountains has the more moisture? Why?
Which plants, belonging to the zone, are not found in this country? Why?
Which animals, belonging to the zone, are not found here? Why?

For Review. — Take imaginary journeys describing the scenery and resources of the region travelled over — the cities passed through.

Trace the great railroad lines, if any.

Take an imaginary journey for business.

Note important historical points — colonies — foreign possessions, if any.

When the study of the countries of a Grand Division is completed, the reading of one of the "Geographical Plays for Schools," will give an excellent review, and furnish material for topical recitation, oral and written.

The time given to the study of the countries must depend upon their relative importance. Our own country and the countries of Europe will need more time than the countries of any other grand division.

A SKETCH FOR THE STUDY OF THE COUNTRIES OF AFRICA (SECOND COURSE), IN CONTINUATION OF THAT GIVEN FOR THE FIRST COURSE.

North Africa.

1. Position just north of the tropic of Cancer. — Climate sub-tropical — wet and dry seasons — irrigation often necessary. — Mountains along the coast, declining in height eastward. — Date, gum, and cypress trees, and aromatic plants ("Land of Dates"). — Lion, gazelle, hyena, jackal.

2. Some reference to the prominent place of North African nations in ancient times: half-buried pedestals (Carthage); hieroglyphics; pyramids; ruins of old Egyptian civilization. — Mohammed. — Conquest and permanent occupation of North Africa by Arabs. — Religion. — Koran. — Two classes of inhabitants: (1) dwellers in cities; (2) pastoral tribes. — Customs. — Description of Cairo, as a representative Mohammedan city, — architecture, bazaars, shops,

baths, mosques, etc. — Caravans. (See Lane's "Modern Egyptians"; Bayard Taylor's "Lands of the Saracen.")

3. Barbary States — names — government — French possession of Algeria. Cities. — Few manufactures, morocco and leather, silk and woollens. — Exports — oil, dates, nuts, sponge.

4. Valley of the Nile — course of the river — country during the overflow — irrigation by canals — villages — the whole population along the river — condition of the country people — government. Products — grain, cotton, beans. No forests — clusters of palms around villages — lotus, papyrus, etc., in canals. (See "Egypt," by Stanley Lane-Poole; "Egypt and Nubia," by J. A. St. John.) Suez canal. — Late war in Egypt — causes of.

Sahara and Soudan.

1. Sahara — a vast desert, equal in area to the whole of Europe, extending across the continent, from the Atlantic to the Red Sea, interrupted only by the narrow strip fertilized by the Nile — consists of large sandy tracts, rocky ridges, and a few oases. Crossed by the tropic, long under a vertical sun, with winds coming over the land to a warmer region, and hence dry. Rainless, except where occasional elevations cool the air and condense the moisture. Around these heights fertility and verdure. Caravans — Bedouins.

2. Soudan — the meeting-ground of Arabs and Negroes. — A great, open plain, fertile and populous — patches of forest; pasture lands; tracts of wild rice, indigo, cotton, sugar-cane, millet, etc., with clusters of palms, acacias, tamarind-trees, and the great baobab. Ridges of hills, and a succession of shallow lakes or ponds often encrusted with natron (carbonate of soda), an important article of commerce. Herds of elephants, antelopes, and giraffes.

Provinces under Mohammedan governors. — Many negro villages, and, across the country, a line of large cities,

trading centres, in which the square, flat-roofed houses of the Arabs, and the round, thatched huts of the negroes, stand side by side. Description of Kano as a representative city. (See Barth, "Travels and Discoveries in North and Central Africa," Vol. III., or Schweinfurth's "Heart of Africa.") The natives, the most advanced of the negro tribes, have a few manufactures; keep cattle; and cultivate a little cotton, grain, and manioc. Caravans from the North bring Arab clothing (shawls, bernouses, etc.), knives, guns, silk, and salt; and carry back natron, ivory, honey, wax, and slaves.

The Abyssinian plateau — nominally independent.

Almost Unexplored Region.

1. South of Soudan, the equatorial region of trade-winds, rains, large rivers (Congo, the largest) and lakes (the headwaters of the Nile). Thick tropical forests with lions, elephants, zebras, antelopes, rhinoceri. Numerous streams with crocodiles and hippopotami; swarms of locusts; mound-building termites; the tsetse-fly; and, among the hills, apes, gorillas, and other large species of the monkey tribe.

Farther south, areas of swamps and grass lands subject to overflow; with scattered gum-trees, euphorbias, etc., in place of the rich tropical forests. — Valley of the Zambesi river.

2. All this interior region inhabited by uncivilized tribes of negroes, and but little known. — Some account of recent explorers. — Condition and customs of natives — houses — occupations. (See Livingstone's "South Africa," and later books; Stanley's "Across the Dark Continent.") Some well-known tribes; as Ashantees, Kaffirs, Hottentots.

West and East Coasts.

West Coast. — Mountain chains, — not very high, parallel with the coast. A strip of low coast lands, hot, moist, and unhealthful; with a desert region, corresponding in position

and cause to the desert of Atacama, in South America. Crossed by rivers, which deposit sand bars at their mouths. Tall palms rise above the luxuriant forests and mangrove jungle on the river banks. — Thatched huts of the natives. — Small trading towns at intervals, chiefly Portuguese and English. — Senegambia, Sierra Leone, Liberia, Guinea, where? — Rice, peanuts, sugar-cane, etc., cultivated; some coffee plantations among the hills. — Exports: oil, peanuts, gold-dust from the river sands; with ivory, ostrich feathers, and beeswax brought by native traders from the interior.

East coast very much like the west, but Mohammedans, rather than English, in the towns. — The highest mountains along this coast.

South Africa.

The region of the tropic of Capricorn is marked by the Kalahari desert; long droughts; want of water.

South of Orange river, ridges running east and west. Tracts of "bush," or fleshy, spiny plants — aloes, etc.; also bulbous plants of great beauty, and a variety of heaths, — all characteristic of dry climates. — Upland grazing. — Community of Dutch Boers. — Gold and diamond mines. — Brief account of Portuguese discovery of the Cape of Good Hope. — Settlement by the Dutch. — Possession by the English. — Recent political troubles. — Ports. — Cape Town. — Elizabeth. — Graham-Town. — Exports: wool, wine, grain. — Description of towns, vegetation, animals, and modes of travel, "Cape-wagons." (See Livingstone's "South Africa," and "Seven years in South Africa," by Dr. Holub.)

GENERAL REVIEW, WITH FURTHER ATTENTION TO IMPORTANT POINTS.

When the countries of the earth have been studied, in the manner suggested, a class should have gathered facts enough concerning both physical and civil geography to make a final consideration of the whole subject both interesting and instructive.

This review should be, not so much a rehearsal of knowledge already acquired, as a comparison and classification of that knowledge, during which new points will be presented and new inferences made.

Such a review will naturally begin with the relation of our earth to the solar system, or with

Astronomical Geography.

More or less of the points suggested can be taught, according to the interest and preparation of the class.

If the whole conception is clear to the teacher, these points can be very simply presented. In some grammar schools all these points are taught with great clearness, and are responded to by the classes with much interest. Such teaching gives to the many pupils, who do not go on to the study of astronomy in higher schools, a life-long habit of observing the daily and yearly phenomena of the heavens. Like all conceptions, that are based upon observation, these points are most readily received by pupils who have not passed beyond the grammar-school age, and they are therefore the surest foundation for advanced study. The memorizing of facts and dependence upon diagrams, without the conception by

the pupils of the celestial phenomena caused by the earth's motions, will result only in confusion.

Note the relative position and sizes of the planets, taking the earth as a standard.

The supposed condition of the sun, as the source of light and heat, and of the stars.

The former belief that the earth was at rest in the centre, and the apparent motions real.

Observations of the apparent movements of sun, moon, and stars encouraged, and reported upon from time to time.

The class will be able to pass from the simple illustrations already given of the earth's motions and of their effects, to the conception of the imaginary celestial sphere, and of the apparent movements upon its concave surface. Such questions as these may lead to it: —

If we should stand where our horizon was unbroken, how would the sky appear to us?

Where would a person stand to see the other celestial hemisphere?

Imagine a vertical line extended to meet this celestial sphere — the points of meeting would be? Point to the *zenith* — the *nadir*.

Draw the horizon-circle in the air.

Imagine the earth's axis prolonged to meet the celestial sphere.

Suppose an observer at the north pole of the earth — where would the prolonged axis meet his celestial sphere? What star would be in his zenith?

Suppose an observer at the equator — where would the pole star be?

Suppose an observer 10° north of the equator — where would he see the pole star?

Where in our sky is the pole star?

Then to what does its altitude correspond?

Imagine our semi-meridian extended to the sky.

Describe it in the air, passing from the north point of the horizon, through the pole star and the zenith, to the south point of the horizon.

Imagine the earth's equator extended to the sky — how much of it above our horizon?

On which side of the zenith does it cross our meridian? How far from the zenith?

Describe it in the air, beginning at the east point of the horizon.

Think of the Tropic of Cancer in relation to the equator — describe its position, if extended to meet our sky. The same for the Tropic of Capricorn.

On what circle of the celestial sphere does the sun apparently move on the 21st of March?

Then describe the sun's path to an observer on the equator, on that day.

Describe the sun's path through our sky on that day.

When does the sun apparently move over the Tropic of Cancer?

Describe his path through our sky on that day.

Describe his path through our sky when vertical at the Tropic of Capricorn.

Describe the sun's daily path at each of these dates from different points of observation — on or near the equator — on or near the north pole — on the Arctic circle.

Describe the movement of the sun during the period of continuous day just north of the Arctic circle — the different place of the mid-day and midnight sun, and of sunrise and sunset through the year.

Illustrate the greater heat of rays falling vertically than of rays obliquely — more rays on a given space, less atmosphere traversed, when falling vertically.

Find the cause of the long twilight in high latitudes.

Describe midwinter in high latitudes, auroras, etc.

The sun's apparent course among the stars during a year marks a great circle on the celestial sphere, inclined $23\frac{1}{2}°$ to the celestial equator, and called the *ecliptic*, because eclipses occur if the moon, when new or full, is on or near this circle.

The sun's apparent movement north and south of the equator, as it becomes vertical to every place within the tropics, is called its motion in *declination*. This corresponds to latitude on the earth. (See almanac for sun's declination.)

State clearly the *three causes* of the sun's apparent motion through a year.

Describe the sun's apparent motion in declination from March 20th to June 21st. From June to September.

Terms Equinox and Solstice — how applied ?

The sun is said to be in the signs Aries, Cancer, Capricorn, etc. (See almanac.) What is meant?

NOTE. — Joslin's "Solar Telluric Globe" illustrates these points and many others very clearly.

Relation of Time to Longitude.

Pupils now understand that rotation brings all the meridians under the sun every twenty-four hours, or that noon travels westward round the earth, at the rate of 15° in an hour.

Mariners sailing westward round the earth lose a day; and sailing eastward gain a day. They must correct their reckoning in each case.

By common consent sailors now change their day in longitude 180° from Greenwich. This meridian passes over the Pacific ocean, and crosses scarcely any land; so it is a convenient longitude for the change of day.

Further practice in determining the difference in local time at two places; their difference in longitude being given and *vice versâ*.

The Tidal Wave.

A result of Rotation, and of the unequal attraction of the sun and moon on different parts of the earth.

The moon the chief tide-producing force. Particles of water free to respond to the attracting force; hence the tidal wave.

Spring tides occur when?

Neap tides occur when? Why?

The form of the coast-line as affecting the height and time of the tide.

Winds — Ocean-Currents — Climate — Flora — Fauna.

If the elementary knowledge of these topics has been applied, as the study of the Grand Divisions proceeded, pupils will be ready now for a more general treatment of them.

Let the class trace long voyages, and decide where the winds and currents would be favorable, and where unfavorable. What changes of climate would be met.

Follow the course of famous explorers, and inquire into the different physical conditions they found.

Compare climates in the same latitudes, and show why isothermal lines do not correspond with the parallels.

Consider the effect of climate upon the life of the inhabitants of different countries.

Compare the vegetation and animals of different grand divisions within the tropics. Account for the contrasts.

Mark out belts of vegetation, corresponding with the distribution of heat and moisture. These broadly stated, and with many local exceptions, are —

An equatorial forest belt, on both sides of the equator, in a region of great heat and moisture.

A desert belt, corresponding with each tropic, where the sun is vertical longer than elsewhere, and there is more dryness with the great heat.

A transition region of pasture or grass lands, between these belts, in each hemisphere.

Another transition region of grass lands, in each hemisphere, beyond the desert belts.

A temperate forest belt, in each hemisphere, where the return trades prevail. A great variety of deciduous trees, the species varying with the increasing latitude.

A belt of mosses and lichens in each hemisphere, between the temperate forests and the polar regions of ice and snow.

Trace the correspondence in vegetation between the base and summit of a high mountain in the torrid zone, and between the equator and the poles.

Trace the lines of volcanic action, and connect their nearness to the ocean with the present theory of volcanic action.

The representation on outline maps of the direction of winds and currents, of the place of important productions, characteristic animals, etc., will be the surest means of fixing this knowledge, though there will not be time for much memory-work of this kind. One outline for climatic lines, another for direction of winds, another for productions, etc., will give clear impressions, which cannot be gained from published maps where all these points are crowded within one outline.

The Work of Water.

On the Surface and Underground.

Review observation lessons on evaporation, condensation, mist, fog, clouds (different kinds), rain.

The distribution of rain depends upon the physical features of a country and the prevailing winds. Mountain sides re-

ceive much rain, because the air, blowing up the slope, is chilled and deposits its moisture. Many mountains have a moist and a dry side, according to the direction of the wind.

Table-lands surrounded by mountains have little rain.

What becomes of the rain? Part of it flows off into the streams and rivers. Part of it sinks below the surface. The underground rain-water sinks through porous soils (sand-beds, sandstones, etc.) and through cracks in the rocks; but it cannot penetrate clay-beds, etc., and flows along under ground till it finds an outlet and forms a spring.

Rain, falling through the atmosphere, takes up carbonic acid gas from the air (we breathe it into the air), and carries it under ground, where it helps to dissolve (we say acids eat) the mineral substances, and thus we have mineral springs.

The salt of the sea comes from the salt dissolved out of the rocks.

Under-ground water forms caves by gradually dissolving the rock-particles and removing them.

Rain, flowing over the ground, dissolves the rock-particles, and the surface rocks gradually crumble into soil. Rain-water, freezing in the rocks, makes them crack. We get soil from the surface rocks mainly by the action of water. Different rocks make different soils, some more fertile than others. Plants, growing in and decaying on the soil, help to form more soil.

Observation lessons from a wayside pool and from a hill-side road, after a heavy shower, will give many points.

Water finds out the lowest levels, all the irregularities of the surface, and brooks and rivers deepen their own channels.

Rock-material is carried by rivers to the sea. Terraces, deltas, ravines, and cañons are formed by the action of water.

The coast-line is changed by the action of waves and tides. Cliffs, bays, and caverns are the effects.

Glaciers.

Perpetual snow fields — motion down the slopes. — The pressed snow formed into ice. — River of ice (glacier) moving down the high valley. — River flowing from the melted end of the ice. — Moraines. — Crevasses. — Rock-scratches. — Icebergs broken from the end of glaciers which reach the coast.

Coral Islands.

In the torrid zone, chiefly in the Pacific and Indian oceans.

Formed around the top of submarine mountains, therefore usually in the form of a ring. Indicate gradual sinking of the sea bottom.

Reefs — Atolls — the result of growth, not of building. The united skeletons of myriads of polyps.

Mode of growth. Difference in the kinds of coral in the different heights of a reef.

Illustrations. Specimens.

Changes on the Earth's Surface.

By *water in motion*, waves, tides, currents, rivers, glaciers, causing erosion, débris, transportation of rocks.

By *winds*, *drifting sands*, etc.

By *volcanoes* and *earthquakes*.

By *vegetation* and *animal life* (coral islands).

Distribution of Land and Water.

Land hemisphere — London about the centre.

Water hemisphere — New Zealand about the centre.

Northern hemisphere more land than water, the continents pointing southward.

Old World stretching from east to west, nearly half round the globe. Mountain framework in the same direction.

New World extending north and south. Mountain framework in the same direction.

Inference — General outline corresponds to direction of mountain systems. (Draw mountain systems of a grand division.)

Old World — vast northern plains.
New World — vast central plains.

The Grand Divisions compared as to

Coast line — navigable rivers and lakes, climate.
Agricultural regions and their products.
Manufacturing regions and their products.
Mining regions and their products.
The great routes for trade and commerce traced.
The probable cargoes of vessels from important ports given.

The Course of Discovery and the Progress of Civilization.

These topics will be specially interesting at the close of the study of the earth as the home of man — noting,

The early civilizations in the valleys of the Nile, Tigris, and Euphrates.

The early but isolated nations of India and China.

Grecian and Roman civilization. (Pyramids, ruins of temples, palaces, etc., as evidences of early civilization.)

Physical conditions for the spread of civilization in Europe — temperate climate, varied coast-line, accessible interior.

Different nationalities there.

Wonderful spread of Mohammedanism.

The Crusades, — Marco Polo's travels, — bringing knowledge of Asia.

Early maritime nations — Genoese — Portuguese.

Discoveries on the coast of Africa. Prince Henry of Portugal.

Search for a passage to India.

Columbus — The New World — Vasco da Gama.

Magellan's circumnavigation.

Cortes and Pizarro — Ancient civilization in the New World.

English, Dutch, and French discoveries and colonies.

Russian America (Alaska).

Cook's Voyages. Arctic Voyages. Explorations in Africa.

Present colonial possessions of different nations.

Recent Japanese civilization.

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